Claims

1. Material based on SiAlONs, characterised in that the raw material mixture of the material consists of component A, an alpha-/beta-SiAlON, and B, a hard material, in the composition of 70 to 97 vol.%, preferably 80 to 95 vol.%, particularly preferably 84 to 91 vol.% of component A and 3 to 30 vol.%, preferably 5 to 20 vol.%, particularly preferably 9 to 16 vol.% of component B.

2. Material according to claim 1, characterised in that component A consists of alpha- and beta-SiAlON and an amorphous or partially crystalline grain-boundary phase.

3. Material according to claim 1 or 2, characterised in that in the sintered state inside the sintered compact the proportion of alpha-SiAlON or of the entire SiAlON phase is 10 to 90 vol.%, preferably 12 to 60 vol.%, particularly preferably 15 to 50 vol.%, and the proportion of beta-SiAlON is 90 to 10 vol.%, preferably 88 to 40 vol.%, particularly preferably 85 to 50 vol.%.

4. Material according to one of claims 1 to 3, characterised in that the content of grain-boundary phase is less than 10 vol.%, preferably less than 5 vol.%, and that the grain-boundary phase is amorphous.

5. Material according to one of claims 1 to 3, characterised in that the content of grain-boundary phase is less than 10 vol.%, preferably less than 5 vol.%, and that the grain-boundary phase is partially crystalline.

6. Material according to claim 5, characterised in that the grain-boundary phases contain crystalline

phases, preferably aluminium-containing melilite or disilicate.

7. Material according to one of claims 1 to 6, characterised in that a sintered compact of the material has an alpha-SiAlON gradient which falls from the outside in and that the alpha-SiAlON content of the as-fired surface can be up to 100%.

8. Material according to one of claims 1 to 7, characterised in that the maximum size of the alpha- and beta-SiAlON grains is less than 90 µm, preferably less than 65 µm, particularly preferably less than 50 µm.

9. Material according to one of claims 1 to 8, characterised in that SiC, Ti(C,N), TiC, TiN, carbides and/or nitrides of elements from groups IVb, Vb and VIb of the periodic table, as well as scandium carbide and/or scandium oxycarbide or mixtures of the cited hard materials, are used as hard materials, component B, whose state remains unchanged after sintering.

10. Material according to one of claims 1 to 9, characterised in that the hard materials are incorporated in an intergranular and/or intragranular manner, i.e. both between and in the SiAlON grains.

11. Material according to one of claims 1 to 10, characterised in that the average grain size of the hard materials is less than 30 µm, preferably less than 15 µm, particularly preferably less than 5 µm.

12. Material according to claim 11, characterised in that the hard material grains are globular, whisker-shaped or platelet-shaped.

13. Material according to one of claims 1 to 12, characterised in that its hardness is > 1550 HV 10.

14. Material according to one of claims 1 to 13, characterised in that it is coated with wear-reducing coatings such as Al_2O_3, TiN or TiC.

15. Process for producing a material based on SiAlONs according to one of claims 1 to 14 by powder mixing, shaping, sintering and grinding, as is used in the production of high-performance ceramic components, particularly those made from SiAlON materials.

16. Process according to claim 15, characterised in that component A is formed during a heat treatment at temperatures of 1800 to 2000°C and retention times at the maximum temperature of 0.5 to 5 hours.

17. Process according to claim 15 or 16, characterised in that the gas atmosphere during sintering is inert and contains N_2 or a mixture of N_2 and other inert gases, particularly argon.

18. Material according to one of claims 1 to 14, produced by a process according to claims 15 to 17, for use as a cutting material.

19. Material according to one of claims 1 to 14, produced by a process according to claims 15 to 17, for use as a cutting material for machining grey cast iron.

20. Material according to one of claims 1 to 14, produced by a process according to claims 15 to 17, for use as a sealing ring.

21. Material according to one of claims 1 to 14, produced by a process according to claims 15 to 17, for use in fuel and coolant pumps, compressors, turbochargers, heat exchangers and air conditioning systems.